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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/727,032	11/30/2000	Sompong P. Olarig	1662-35000 (P98-2412)	2969

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EXAMINER

KING, JUSTIN

ART UNIT	PAPER NUMBER
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2111

DATE MAILED: 04/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/727,032	Applicant(s) OLARIG, SOMPONG P.	
	Examiner Justin I. King	Art Unit 2111	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 4/2/04.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,5-15 and 17-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 5-15, and 17-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Examiner hereby withdraws the finality of the paper #10 dated 1/21/04.
2. In response to Applicant's argument that the Lu neither discloses nor teaches any feature of bus arbitration or controlling bus access among multiple bus devices, and Lu's invention relates to job workload distribution on a network (Remark, page 3, the first three lines of the paragraph 2): The Office Action rejections uses Metz instead of Lu to disclose the features of bus arbitration and controlling bus access among multiple bus devices. Lu's invention does focus on the network workload distribution. The alleged invention relates to a bus system. Both an internal bus (within one computer unit) and a network bus (connecting multiple computer-unites) are buses. The claim language does not exclude the scope of the bus from a network bus.
3. In response to applicant's argument that there is no suggestion to combine the references (Remark, page 4, the second line of the first paragraph): The examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Lu explicitly discloses the motivation on column 2, lines 28-30.
4. In response to Applicant's argument that neither reference suggests or teaches that a device requesting bus access identify the number of operations awaiting execution on the bus

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(Remark, page 4, lines 2-3 of the second paragraph): Metz discloses the a device requesting bus access identify the fullness of the queue, and teaches that it is known to arbitrate based on current workload of each queue. Lu discloses that it is known to disclose the number of operations awaiting execution. See the claim rejections below.

5. In response to Applicant's argument that the nodes in the Lu do not make conflicting access requests (Remark, page 4, lines 4-5 of the second paragraph): The Office Action rejection uses Metz to disclose the conflicting access request.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claims 1, 5-6, 8-15, and 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Metz (U.S. Patent No. 5,448,701) in view of Lu et al. (U.S. Patent No. 6,202,080).

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Referring to claim 1: Metz discloses a computer system comprising a computer bus coupling together a plurality of bus devices; a bus arbiter coupled to the computer bus, said bus arbiter receiving requests from said plurality of bus devices to obtain access to the computer bus; wherein said bus arbiter resolves conflicting requests from said bus devices based on the workload of the bus devices that request access to the computer bus (Metz's claim 10). Metz discloses a first storage means for storing data to be transmitted (Metz's claim 10's preamble), which is the queue. Metz discloses that each of said plurality of bus devices asserts a signal to said bus arbiter when one or more operations are pending in the queue (column 1, lines 29-30, well-known prior art). Although Metz discloses the signal indicates the fullness and the queue, Metz does not explicitly disclose that the signal includes the number of pending operations and granting based on the number of pending requests. But Metz does disclose that it is known to arbitrate based on current workload of each queue (column 2, lines 48-50, the receiving queue's relative emptiness), and Metz discloses that it is already known in the prior art to focus on the resource queue's status (column 1, Background Of The Invention's last paragraph), hence, Metz implicitly discloses that it is known to arbitrate based on the comparison on the source queues' workload.

Lu discloses that it is known to monitor and to compare the number of the pending operations in each queue (node) in workload balancing (figure 5, step 704). Hence, it would have been obvious to one having ordinary skill in the computer art at the time Applicant made the invention to adapt Lu's teaching to Metz because Lu enables one to simplify workload distribution without root-level access and ability to function in unexpected situations.

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Referring to claim 5: Claim 1's argument applies; furthermore, Metz discloses comparing each queue's status and awards access to the bus device with the most workload/pending operations (claim 10).

Referring to claim 6: Claim 5's arguments apply; furthermore, Metz discloses that the bus arbiter breaks any ties between bus devices with an equal number of operations pending in the queue based on a predetermined priority value assigned to each bus device (column 4, lines 11-13).

Referring to claim 8: Claim 1 and 5' arguments apply; furthermore; Lu discloses JobRequestQueue (figure 2, field 206) and JobOnNode (figure 2, field 205); therefore, in order to express both fields, Lu's signal indicating the number of operations pending in the queue comprises a multi-bit signal. Furthermore, because of the computer's binary nature, the signal must be multi-bit in order to express any number greater than 1.

Referring to claim 9: Claims 1, 5, and 8's arguments apply, furthermore, the binary-base number is a standard practice in computer system.

Referring to claim 10: Claim 1's argument applies; further, Metz discloses a "T" signal to indicate the predefined threshold been exceeded (column 4, lines 55-57). Such that Metz discloses asserting a signal to the arbiter indicating a range (threshold to full) of operations pending in the queue.

Referring to claims 11 and 13: Metz discloses a computer system comprising a bus a plurality of bus devices, each of which couples to said bus, and each of which is capable of running cycles on said bus, and each of said bus devices includes a queue in which pending operations are stored while the bus device awaits access to the bus; a bus arbiter coupled to the

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bus, said bus arbiter receiving request signals from said plurality of bus devices that are seeking to run a cycle on said bus; wherein any of said devices that include one or more operations in its queue transmits a signal to said bus arbiter requesting access to said bus (claim 10).

Although Metz discloses the signal indicates the fullness and the queue, Metz does not explicitly disclose that the signal includes the number of pending operations. But Metz does disclose that it is known to arbitrate based on current workload of each queue (column 2, lines 48-50, the receiving queue's relative emptiness), and Metz discloses that prior art only focuses on the resource queue's status (column 1, Background Of The Invention's last paragraph), hence, Metz implicitly discloses that it is known to arbitrate based on the comparison on the source queues' workload.

Lu discloses that it is known to monitor and to compare the number of the pending operations in each queue (node) in workload balancing (figure 5, step 704). Hence, it would have been obvious to one having ordinary skill in the computer art at the time Applicant made the invention to adapt Lu's teaching to Metz because Lu enables one to simplify workload distribution without root-level access and ability to function in unexpected situations.

Referring to claim 12: Claim 11's argument applies, Metz discloses that each of said plurality of bus devices is capable of running bus cycles on said bus, and wherein said signal requesting access to said bus is a request for ownership of said bus (claim 10).

Referring to claims 14-15: Claims 11 and 13's arguments apply; furthermore, the number of pending entries in each queue is an inherent nature of the system operation's characteristics. Therefore, the bus devices may have queues with same numbers of entries or different numbers of entries.

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Referring to claim 18: Metz discloses a computer system comprising a computer bus coupling together a plurality of bus devices; a bus arbiter coupled to the computer bus, said bus arbiter receiving requests from said plurality of bus devices to obtain access to the computer bus; wherein said bus arbiter resolves conflicting requests from said bus devices based on the workload of the bus devices that request access to the computer bus (Metz's claim 10). Metz discloses a first storage means for storing data to be transmitted (Metz's claim 10's preamble), which is the queue. Metz discloses that each of said plurality of bus devices asserts a signal to said bus arbiter when one or more operations are pending in the queue (column 1, lines 29-30, well-known prior art). Although Metz discloses the signal indicates the fullness and the queue, Metz does not explicitly disclose that the signal includes the number of pending operations and granting based on the number of pending requests. But Metz does disclose that it is known to arbitrate based on current workload of each queue (column 2, lines 48-50, the receiving queue's relative emptiness), and Metz discloses that it is already known in the prior art to focus on the resource queue's status (column 1, Background Of The Invention's last paragraph), hence, Metz implicitly discloses that it is known to arbitrate based on the comparison on the source queues' workload.

Lu discloses that it is known to monitor and to compare the number of the pending operations in each queue (node) in workload balancing (figure 5, step 704). Hence, it would have been obvious to one having ordinary skill in the computer art at the time Applicant made the invention to adapt Lu's teaching to Metz because Lu enables one to simplify workload distribution without root-level access and ability to function in unexpected situations.

Referring to claim 17: Metz discloses a method of arbitrating bus access; therefore, each of Metz's bus devices is capable of initiating cycles on the computer bus.

Referring to claim 19: Metz discloses that each device has a queue for storing pending entries.

9. Claims 7 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Metz in view of Lu, and in further view of Lee (U.S. Patent No. 5,692,149), and "Operating System Concepts" by James L. Peterson and Abraham Silberschatz.

Referring to claims 7 and 20: Metz and Schroter's disclosures are stated above, but they do not explicitly disclose breaking any ties between bus devices with an equal number of operations pending in the queue based on the length of time since each device was last granted access to the computer bus. "Operating System Concepts", as a popular textbook, teaches the round-robin algorithm for distributing the shared resources (pages 122-125). Lee explicitly discloses that it is known to apply round-robin to resolve any priority tie (column 9, lines 53-55). Hence, it would have been obvious to one having ordinary skill in the computer art at the time Applicant made the invention to adapt Schroter, Lee, Peterson, and Silberschatz's teachings to Metz because Schroter enables one to closely analyze workload by monitoring the number of each queue's pending operations, Peterson, Silberschatz, and Lee teach one to use the round-robin in distributing the system resources and resolving any priority tie.

Conclusion

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

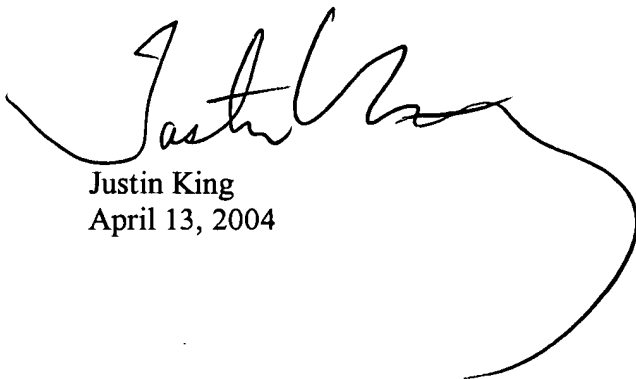
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Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Justin King whose telephone number is (703) 305-4571. The examiner can normally be reached on Monday through Friday from 9:00 A.M. to 5:00 P.M..

If attempts to reach the examiner by telephones are unsuccessfully, the examiner's supervisor, Mark Reinhart can be reached at (703) 308-3110.



Justin King
April 13, 2004



XUAN M. THAI
PRIMARY EXAMINER
TC 2100